Please replace the identified paragraphs of the specification with amended paragraphs as follows:

Page 20, first paragraph (lines 1-12):

For a system with the eluent and exchanger phase each occupying a width of 500 μm, a length of 5 cm, with 10 mM HCl as eluent (Cl diffusion coefficient 2000 μm²/s) being exchanged with a hydroxide form anion exchanger, Figure [[2]] 1 shows the computed fraction exchanged as a function of flow rate for three different types of exchangers: (a) 1 μm size ion exchange resin suspension, (b) 100 nm size ion exchange resin suspension, and (c) dissolved TOAOH, the equivalent exchanger concentration being 50 mM in each case. The diffusion coefficient of the particulate exchangers were estimated, assuming spherical shape and the Stokes-Einstein equation, to be 0.215 and 2.15 μm²/s for 1 and 0.1 μm diameter particles, respectively. The diffusion coefficient of TOAOH was estimated from the equivalent conductance values of tetralkylammonium ions ranging from tetramethyl- to tetrabutyl- and applying a model:

Page 20, second paragraph (lines 16-26):

Where G is the equivalent conductance of the tetraalkylammonium ion, n is the number of carbon atoms in the alkyl chain, and a and b are constants. The available data fits this model (linear correlation coefficient, $r^2 > 0.99$) and leads to an extrapolated value of G for TOA$^+$ of 11.1 S.cm² equivalent. The Nemst-Einstein equation then allows the estimation of the diffusion coefficient of TOAOH of TOACl (which are largely controlled by the size of the TOA$^+$ moiety) as 294 μm²/s. The results in Figure [[2]] 1 show that the dissolved exchanger with its much greater diffusion coefficient is obviously more effective. However, it would be possible to use a more concentrated suspension of a particulate exchanger without risk of bleedoff and confine it to a narrower section of the total channel width to make more efficient use of the exchanger.

Page 20, last paragraph (lines 28-31): *to page 21, line 1):*

In Figure [[3]] 2, we show other computational results for parametric variations. In Figure [[3a]] 2A, the width of the 5 cm long channel is varied while 10 mM HCl is used as eluent and 50 mM TOAOH is used as the exchanger, both flowing at 5 μL/min. The greater efficiency of smaller channel widths is readily apparent.

2-14

Page 21, first paragraph (lines ~~1-13~~):

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Figure [[3b]] 2B shows a case where the fraction exchanged is plotted against the channel length for the suppression of 40 mM HCl with 50 mM TOAOH flowing at 5 μm/min in a device where each phase occupies a 100 μm width. Sufficient length is necessary to make good utilization of the regenerant even in a narrow channel width. Figure [[3c]] 2C shows a case identical to that in Figure [[3b]] 2B except that the channel length is fixed at 5 cm and the eluent concentration varied. This resembles typical suppressor behavior, insomuch as suppression is quantitative below some maximum eluent concentration. Figure [[3d]] 2D has the other parameters set the same as Figures [[3b]] 2B and [[3c]] 2C except that the eluent concentration is fixed at 10 mM and the diffusion coefficient of the ion to be exchanged is varied. In cation chromatography, where either HCl or $HClO_4$ (or any other acid) can be used as eluent, it is advantageous to use a small mobile counterion containing acid such as HCl.

Page 29, line 3:

~~Table 2~~ Table 3. Properties of solutions for simulation of horizontally layered flows.

Page 29, second paragraph (lines 19-29):

The volume-of-fluid (VOF) interface model was used to track the fluid interface. Full surface tension effects were activated, including both normal and tangential surface tension forces. Gravity was applied in the negative z-direction. Figure [[10]] 9 shows the results at various input velocities. As can be seen there, the layered configuration becomes stable for the butanol/water flow at somewhere between 5 and 10 mm/sec input velocities, while the chloroform/water flow always assumes the segmented configuration. Experimentally the butanol/water layered flow became stable between 1 and 5 mm/sec, while the chloroform/water layered flow could not be stabilized at any velocity. Thus we have a good qualitative prediction of the flow behavior, but the simulation accuracy does not seem sufficient for high precision modeling.

Page 29/30, the paragraph spanning lines 30-34 on page 29 through lines 1-9 on page 30:

Parameters relating to the stability of the flow pattern include density, interfacial surface tension and wetting angle. Investigations were performed using a 1 cm channel. Butanol is less dense than water, hence the layered configuration studied in which butanol flows on top should be stabilized by buoyancy effects. However flow experiments indicate that the butanol/water layered flow is also stable when

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here are also dated.

Page 38, third paragraph (following "Example 5") (lines 25-31) through page 39, (lines 1-4) ~ yec 5/11/09

Figure [[7]] 6 shows conductivity suppression experiments with colloidal aqueous ion exchanger suspension. The efficiency is similar for anion and cation exchanger suspensions and, as such, may be predicted from an effect comparable to that observed for the TOAOH system. The residual conductance probably arises from impurities in the ion exchanger suspension generated during grinding, etc., since the suspension was not purified. Various concentrations of NaCl were injected from a sub- mM to 10 mM level in a 10 mM NaOH –Dowex 50WX8 suspension system. The high concentrations resulted in peaks exceeding 100 μS/cm in height. Similar results were achieved for the suppression of 10 mM NaOH with the anion exchanger resin suspension. One obvious benefit of using resin suspensions is that no organic solvents are involved.

Page 39, first full paragraph (following "Example 6") (lines 8-14):

Figure [[8]] 7 demonstrates the feasibility of conductometric detection of a range of heavy metals injected into the system with Amberlite LA-2. Note that even metals such as silver or copper can be detected, though their sensitivity is somewhat lower than the corresponding sensitivity for other metals, probably due to their complex formation with the secondary amine present in the exchanger phase. This approach can potentially have an appropriately functionalized membrane-based analog in a macrosystem.